Invertebrata

Tasmania's Invertebrate Newsletter

Inside...

Features:

Articles:

November 1997
No. 9

Invertebrata is produced by the Queen Victoria Museum and Art Gallery, Launceston, Tasmania.

We publish articles and short notes on all aspects of invertebrate biology and conservation in Tasmania.

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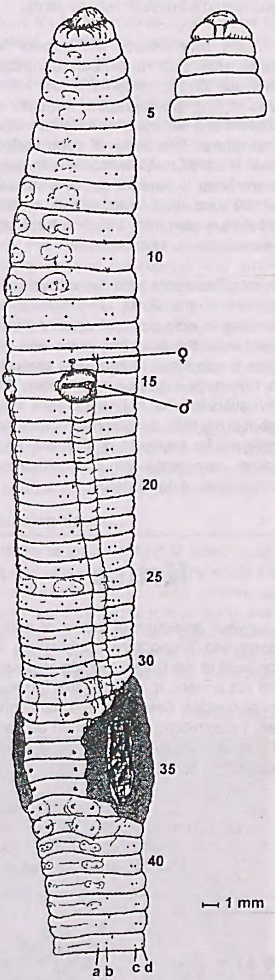
First 'common earthworm' found in Tasmania

The European earthworm *Lumbricus terrestris* Linnaeus, 1758 has been found in a suburban garden in Launceston – the first authenticated record of this species in Australia.

Studies on *L. terrestris* have a long history as it was one of the species considered by Charles Darwin in his famous treatise on earthworms (Darwin 1881). In the past, various species of earthworms introduced into Australia have been misidentified as *L. terrestris*. An unfortunate consequence of earlier unsubstantiated accounts of its presence here is that it has been erroneously listed as an introduced species in the scientific literature. Here I describe the animal, give details of the Launceston find and comment on earlier accounts of its distribution. A formal scientific note on *L. terrestris* in Tasmania will appear elsewhere.

Description *Lumbricus terrestris* (see illustration) is a fairly stout-bodied earthworm about 250 mm long and 12 mm wide. The posterior third of the body flattens and assumes a spade-like shape when the worm is disturbed. In life, the top of the worm is gunmetal grey with a blue iridescence, while the underside is pink and the clitellum ('saddle') is yellowish. There are 136 segments, with the clitellum on segments 32-37. There are eight setae per segment, closely paired in regular rows. Dorsal pores: 7/8 small, from 8/9 larger. Nephropores: large at anterior margin of segment just lateral of the 'b' setal line on many segments (e.g. on right-hand side on 11-15, 20, 22-25, 28, 30-36, 39-44, etc.), irregularly alternating to between the 'd' line and mid-dorsum (e.g. on right-hand side seen in dorsal position on 3-7, 9, 17-19, 21, 26-27, 29, 33-34, 37-39, 44-45) (Note: See illustration for location of 'a', 'b', 'c' and 'd' setal lines. It is not known why in some segments the nephropores appear to be in both positions on one side.) Spermathecal pores: in 9/10/11 in 'cd', nearer to 'c' lines. Female pores: paired, just lateral of 'b' setae on 14. Male pores: towards lateral extremity of equatorial slits within tumid lips be-

(continued on page 5)



Ventrolateral view of *Lumbricus terrestris* Linnaeus, 1758, and dorsal view of prostomium (QVM specimen 14:3648)

Editorial

Apologies to any readers who've looked for *Invertebrata On-Line* and found no issues later than no. 5. Unbeknownst to your editor, the QVMAG home page had gone to sleep because Museum staff have been flat out with planning and executing the move to new premises at Launceston's Inveresk railway yards.

In 1998 *Invertebrata* will appear in March, July and November. Contributions are always welcome in any form. Reproducing photographs remains a problem and we would much prefer line illustrations. One kind of contribution which is ESPECIALLY welcome is money. *Invertebrata* is paid for out of a special QVMAG fund which relies heavily on the odd dollars sent in by readers. Receipts are available for tax purposes.

Forestry Tasmania, with the enthusiastic support of the State Government, is planning to rip up a vast area of State forest over the next few years and replace it with *Pinus radiata*. The abstract on this page provides ammunition for both sides in what is likely to be a loud debate on this development. *Invertebrata* will be happy to publish any zoological comments on the proposed 'conversion' of native forest.

Notice

A voucher collection of larvae of some Tasmanian Trichoptera (caddisflies) is now held at the Queen Victoria Museum and Art Gallery. It includes the families Conoesucidae, Calocidae and Helicophidae. I assembled the collection as part of a project funded by the National River Health Program.

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Still for sale!

A first edition of T.H. Savory's 'The Arachnida' (1935; London: Edward Arnold & Co.; 218 pp.), very good condition. What offer? (Contact the editor.)

Invertebrate Calendar

(This is the place for notices of conferences and meetings, lectures and seminars, birthdays and anniversaries, annual mating swarms, etc. The absolutely final Calendar deadline for the March 1998 Invertebrata *is Friday, 20 February.)*

9-12 December 1997 – *The Other 99%: The Conservation and Biodiversity of Invertebrates*; conference at Australian Museum, Sydney. Sessions on 'Assessing the Other 99%', 'Describing the Other 99%', 'Invertebrate Conservation through Legislation and Policy' and 'The Invertebrate Agenda'. Details available from Organising Committee members: Dr Winston Ponder (02) 9320 6120, Dr Alix Bean (02) 9320 6224, Dr Gerry Cassis (02) 9320 6346, Dr Pat Hutchings (02) 9320 6243, Dr Richard Major (02) 9320 6183; address for all is Invertebrate Biodiversity Conference, Australian Museum, 6 College St, Sydney NSW 2000; fax (02) 9320 6050; email for the conference is invert@amsg.ausmus.gov.au.

16-18 March 1998 – Aquatic Ecology Postgraduate Workshop at the Queenscliff Marine Station, near Melbourne. A bargain at $85 for tuition, food and accommodation! For information on the 1997 workshop and links to other Websites see http://www.arts.unimelb.edu.au/Dept/Geography/aepgw/aepgwhome.html, or contact Mike Holloway, Department of Zoology, University of Melbourne, Parkville VIC 3052, phone (03) 9344 4334, fax (03) 9344 7909.

[*The paper abstracted below was presented at last month's Ecological Society of Australia conference at Charles Sturt University, Albury. More abstracts from ESA97 can be found on the Web at* http://life.csu.edu.au/esa/esa97/abstracts. *Non-entomological readers should note that several* Chlenias *species are known to attack* P. radiata *in Tasmania, where they are known as 'pine loopers' and are sometimes responsible for severe defoliation in plantations. – Ed.*]

The Costs of Feeding on an Introduced Tree Species for an Australian Lepidopteran

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Some insect herbivores can feed on a broad range of unrelated plant species with apparent impunity, overcoming many of the possible plant defences in these plants. Many theories pertaining to the host range of insect herbivores would suggest that previous exposure to a group of plants pre-adapts herbivore taxa for certain hosts. There are few native gymnosperms in the southeastern region of Australia and none belonging to the family Pinaceae. It is, therefore, somewhat surprising to note that there are at least seventy endemic species of Lepidoptera found feeding on the introduced conifer *Pinus radiata* D. Don (Pinaceae) in this region. I compared the feeding ecology of final instar larvae of a native lepidopteran on three host plant species, *P. radiata, Eucalyptus obliqua* L'Her. and *Acacia mearnsii* De Wild, to determine whether there was a negative effect incurred by feeding on an introduced host plant relative to the effect of feeding on native host species. The larvae of *Chlenias auctaria* Guene (Geometridae: Ennominae) normally feed upon a wide variety of woody species, including *P. radiata*. Performance was measured by using the gravimetric method; fitness was estimated from pupal weights. It was found that both the performance and fitness of larvae feeding on *P. radiata* was significantly diminished compared with larvae feeding on the other two hosts.

How to...

Video microscopy on the cheap

If you own a PC, you can put together a 'video microscope' using off-the-shelf components for less than $1000. Here I describe the set-up used to capture the image on this page. Lots of variations are possible and you can probably beat me on price, image quality or both.

Overview

What I did was put a 35mm camera lens and extension tubes on a black-and-white security-type video camera. The video signal from the camera goes into my PC and I take a video snapshots by freeze-framing the images on my monitor and saving them as bitmap files on my hard drive. That's it in a nutshell. Now for the details...

Video camera

Security-type video cameras (CCD minicams) are the kind that keep an eye on you in shops and banks. They come in colour and black-and-white versions and are either mains-powered or run off a low-voltage, regulated power supply. They currently range in price from about $150 to $1000. Mine is a mains-powered JVC TK350EG, a b/w camera with a nominal 800 x 600 pixel image. Security-type cameras are designed for low-light conditions, which means you don't need a flash or other special lighting, even for extreme close-ups. 'Ambient' lighting is fine. The camera automatically compensates for varying light levels.

Lenses

Security-type cameras usually come with a screw-on wide-angle lens. I replaced this lens with an adapter which allows me to screw on '35mm-type' camera lenses and extension tubes. All these items are readily available at new and second-hand camera outlets, or can be borrowed from existing camera kits. The particular combination of lens, tube and working distance you need is best worked out by tinkering. In my case a 28mm lens and 50mm of extension tube fills the PC screen with an object 5mm across. Because the video camera works fine in low light, I set the lens at f/16 to get a good depth of field.

Image capture

Video capture cards for PCs cost $200-$400. I use a 'Buster' brand card with 'Multimedia Navigator' software. The PAL composite signal from the camera is fed over a 2m cable to the computer, where the video image appears in a window on the 'Navigator' screen. Here I can tinker with brightness and contrast to get just the picture I want. Looking at the image full-screen, I focus it (see below) and then freeze-frame the picture. Unfortunately, the freeze-frame feature in 'Navigator' doesn't let you take a second video snapshot before you've saved the first to your hard drive. I do my freeze-framing instead with the screen-capture feature in the graphics program Paint Shop Pro 4, which lets me take up to nine snapshots in a row without taking my eyes off the live video image. Other graphics programs also have a screen-capture feature and there are some very nice screen-capture utilities available as freeware and shareware.

Image processing

My video snapshots are 640x450 pixels (nearly full screen) and are 24-bit images (16 million colours) with a bitmap file size of something under 1mb. I shrink these to 8-bit greyscale images (256 colours, but actually black, white and 254 shades of grey) using Paint Shop Pro 4 and save them to my hard drive as 290kb bitmap files. These can later be called up for adding text, cropping, modifying, sticking into reports, printing, etc. The images can also be sent over the Net after conversion to 30-40kb JPEG files.

Mechanics

The video camera is fixed to an upright, telescoping rod on a workbench by the computer. The rod itself can be clamped in any position, which gives me coarse focus and a limited zoom. Fine focussing is done by moving the specimen stage (a flat piece of stiff plastic) up and down with a rack-and-pinion support I pirated from an old microscope. I could replace this jerry-built affair with an expensive copy stand, as used for enlarging photos, but I'm too cheap.

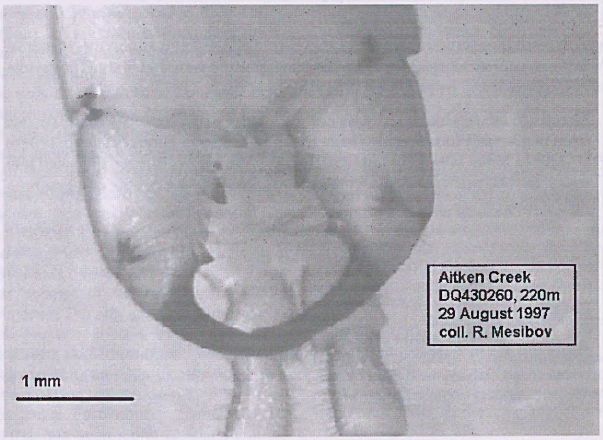
Colour

I built my 'video microscope' mainly to replace a camera lucida, an optical gadget which allows me to accurately trace line illustrations over a magnified image. Now I can video-snap the magnified image, print it out and trace the printed copy, checking details with the image on the computer screen. This is black-and-white artwork, and b/w video is sufficient for this use. B/w is also OK for digital pictures to accompany the text entries in my specimen databases, and for reports and other everyday printed uses. For serious documentation and gee-whiz artwork, I'll need the colour version of my JVC. This currently costs $950, but I wouldn't be surprised to see good-resolution colour CCD minicams selling for $500 in 1998. The change-over from b/w to colour will be simple: unplug the old camera and plug in the new one. Video capture cards and graphics programs, of course, are already colour-friendly.

Amazing times...

This home-grown hybrid of video imaging and close-up photography could be considerably refined, and interested readers are invited to join in the tinkering. The technology has been around for years. What's new is that cost is down and ease of use is up. Both look to be continuing trends.

Bob Mesibov



Cats and Toxoplasmosis

Members of the cat family (Felidae) are the definitive hosts of the protozoan parasite *Toxoplasma gondii*. Toxoplasmosis, a disease associated with this parasite, can be contracted by Australian marsupials through indirect contact with our only felid, the domestic cat *Felis domesticus*.

The eastern barred bandicoot, *Perameles gunnii*, appears to be particularly susceptible to toxoplasmosis. The disease is recognised as an important threat to the long-term survival of this bandicoot, both in its relict population in Victoria and in its more secure stronghold on the mainland of Tasmania. A recently completed field study of *P. gunnii* in Tasmania found no serological evidence for exposure to *Toxoplasma* in free-range bandicoots. Once exposed, however, bandicoots rapidly develop an acute and fatal infection (Obendorf et *al.* 1996).

Coprophagic (feces-eating) invertebrates such as earthworms, snails, flies and ground beetles were already known to act as mechanical transport hosts for *Toxoplasma* oocysts, either through ingestion of cat droppings or of soil contaminated with cat fecal material. Oocysts pass through the gut of these invertebrates and are dispersed in their excreta. *T. gondii* oocysts on grasses and other edible groundcovers are a recognised source of infection for grazing herbivores and omnivores.

As earthworms and beetles make up a significant proportion of the diet of *P. gunnii*, these soil invertebrates seemed to be highly likely sources of *Toxoplasma* for bandicoots. A three-year study in the Huon Valley found numerous earthworm chaetae (bristles) in bandicoot feces, and as might be expected the proportion of fecal samples with chaetae was higher in winter than summer (51% vs. 28%; data from Mallick et *al.* 1996).

Under experimental conditions two eastern barred bandicoots were fed earthworms exposed to soil containing oocysts (Bettiol *et al.*, in press). The animals developed clinical signs of toxoplasmosis and died 11 and 14 days, respectively, after feeding. Histopathological examination of various tissues from the two bandicoots suggested that the animals were overwhelmed by acute, generalised *Toxoplasma* infection. The study confirmed that *P. gunnii* can contract toxoplasmosis by eating earthworms exposed to oocyst-contaminated soil, and it was further demonstrated that oocysts in the alimentary tract of the worms, rather than infective stages in the body tissues, were responsible for the infection.

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References:

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gnammas

and Their Freshwater Fauna

The word 'gnamma' is of Aboriginal origin (Western Desert language) and refers to a rock hole commonly, but not necessarily, in granite and especially one capable of holding water. Gnammas are basically the product of chemical weathering by water. Although often used, the term 'gnamma-hole' is a tautology; the concept of 'hole' is already incorporated in 'gnamma'!

There are huge amounts of granite in Western Australia and in the winter of 1990 I sampled a large number of flooded gnammas in that State. The results of that work will be published later this year (Bayly 1997).

The study of freshwater organisms in gnammas in eastern Australia has been neglected but I recently made a humble start on Flinders Island, where I hope to keep several gnammas under observation during the next few years. In June this year I discovered a particularly fine example of a gnamma near Killiecrankie.

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Reference:

Bayly, I.A.E. 1997. Invertebrates of temporary waters in gnammas on granite outcrops in Western Australia. *Journal of the Royal Society of Western Australia* 80 (in press).

Max/min box

The Biggest Invertebrates of All...

...grow to 15m long and live in Tasmanian waters, where three specimens were recently taken by fishermen. Details weren't available for the November *Invertebrata* but we hope to track down Mark Norman of the Museum of Victoria for the full story, hopefully to appear in the March issue. Anyone know where we can find stills from the 1950's Hollywood monster film *It Came from Beneath the Sea*?

Earthworm find *(continued from page 1)*

tween 'a' and 'c' setal lines, confined to 15; distinct mound tract (formed by parallel seminal grooves?) extends from male pores (or female pores?) to clitellum between 'b' and 'c' line on both sides. Genital markings: ventral setal couples within slightly tumid pads, especially 8,9-11, 25, 31-32 and 37-38; tubercula pubertatis as elongate smooth pad just median of 'c' line in 33-36 on both sides. Details of the internal anatomy of *L. terrestris* are readily available in zoology text books (e.g. Sims and Gerard 1985, figs. 4 & 6). In order to avoid excessive damage to the single available specimen, I have not dissected it. The description agrees with that of Sims and Gerard (1985; pp. 106-108, figs. 1, 37 & 38), who for internal anatomy only remark on the septa and seminal vesicles, and also with descriptions by Gates (1972; pp. 118-123) and Lee (1959; pp. 365-368).

Biology I found the animal (QVM registration number 14:3648) on the soil surface while I was digging to 1 m depth in black clay in a suburban garden at 145 Holbrook Street, Invermay, Launceston on 29 June 1997. The specimen is mature and complete; it was fixed in 10% formalin and preserved in 80% ethanol.

The characteristic spade-shaped tail is believed to enhance gripping of the burrow walls, as the worm's foraging behaviour is to anchor the tail in the mouth of the burrow and to drag leaves and twigs back down for feeding. The burrow may extend to 3 m depth, and the entrance is often marked by a small midden of pebbles and twigs as well as a plug of leaves, etc. (Gates 1972, Sims and Gerard 1985). *L. terrestris* is usually described as being nocturnally active (e.g. Linnaeus, 1758; p. 647 ; '*adscendit noctu*'), and its above-ground wandering and copulation have earned it the common name in North America of the 'European Nightcrawler' (in French Canada, '*ver nocture rampant*'). However, its dark pigmentation indicates a need for protection from sunlight and the present specimen was rapidly escaping over the soil surface in daytime. This escape response may have been excited by my digging; perhaps I reminded the worm of a European mole (*Talpa* sp.) for which *L. terrestris* is a favourite food! Such an escape response is exploited by predatory birds like lapwings (*Vanellus* spp.) that mimic the mole-digging vibrations by stamping on the soil surface (Darwin 1881; p. 28)

Confusion A number of references note that other earthworm species have frequently been confused with *L. terrestris* in the past, possibly due partly to its inaccurate characterisation in school texts as 'the common earthworm', an expression rejected for this species by, amongst others, Stephenson (1930) in a preface to his great monograph. Gates (1972; p. 123) remarks that 'A belief that almost any earthworm is *Lumbricus terrestris* is not entirely restricted to high-school graduates who have had an elementary course in biology (*cf.* Stephenson, 1930: p. xi). The species used in a recent electron-microscope study of sperm cytology was said to be *L. terrestris* but actually was *Allolobophora* [=*Aporrectodea*] *tuberculata*'.

A species that has often been confused with *L. terrestris*, until relatively recently, is *Aporrectodea longa* (Ude). The distribution of this latter species given by Sims and Gerard (1985; p. 64) extends to 'Australia (including Tasmania)'. *A. longa* has been frequently reported from Australia; see Blakemore (1997; p. 607) for a list of records for this and for 15 other introduced lumbricid species. For example, Wood (1974), while acknowledging Professor Jamieson for identifying the earthworms, recorded this species as *Allolobophora terrestris* f. *longa* (Ude) from Kosciusko National Park. Gates (1972; pp. 75-76), who had earlier shown that this latter name is illegitimate, went on to state that '*A. longa* is not known to have been sold or used for bait in North America but the species may have occasionally been mistaken for [*L.*] *terrestris*, unless anglers are more careful than university professors.

Distribution According to Sims and Gerard (1985; p. 108) the Southern Hemisphere distribution of *L. terrestris* includes 'Holarctic and temperate regions of South America, Australia, New Zealand, several temperate oceanic and other southern islands'. It is said to be found 'in many undisturbed, terrestrial habitats, most numerous in grasslands (including lawns) and orchards, less common in woodland, arable soil and river banks. Found in alkaline soils of pH 6.2-10.0; especially abundant in clay'. In New Zealand, Lee (1959; pp. 367-368) regarded this species as 'quite common in garden soils in Auckland, Hamilton, and probably in other nearby towns'. However, the record of this species from 'Australia' in Sims and Gerard (1985) is unauthenticated, although these authors cite Gates (1972) in their references and Gates (1972; p. 119) lists this species in Australia, again without reference. The only earlier report that I can find for this species in Australia is by Jamieson (1965; p. 40) where, after explaining how 'essential' it was not to confuse species, he proclaims: 'The British "Common Earthworm", *Lumbricus terrestris*, has been found to flourish in Australian earthworm farms and is of value'. Reynolds (1977; pp. 7 & 101) explains how *L. terrestris*, although routinely collected at night for fishing bait and study in North America, cannot be commercially cultured economically because of its long life cycle, low reproductive rate, and large spatial requirements. Jamieson's report of this species in Australian worm farms is therefore highly dubious. Furthermore, since no specimens of *L. terrestris* are known in any reference collection in Australia, and since Jamieson (1981; pp. 898-899) fails to mention this species amongst the six lumbricids he does report from Australia, then Jamieson's earlier claim is most likely erroneous.

The finding of *L. terrestris* brings to about 60 the author's (unpublished) tally of introduced earthworms in Australia.

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When a Paper Nautilus is not a nautilus

A work trip to Flinders Island last April resulted in a new display for the Tasmanian Museum and Art Gallery. I went to the island, together with other members of the Tasmanian Marine Naturalists Association, for a short course on marine invertebrate zoology. How can one ever go to Flinder Island without getting caught up in the magic of the Paper Nautilus? Even before the alarmingly small plane left Launceston Airport I was captured by the logo of the shell on the plane's tail. Between lectures, field trips and updating TMAG's invertebrate displays, we relentlessly sought this incredible work of nature. Undaunted by the tracks of 4-wheel-drive vehicles along the beaches (signs of ritualistic early-morning searches by well-established locals) we took to the vegetation above the sand line. Logic said wind would carry the fragile shells into the tangle of vegetation, and we were rewarded with several perfect specimens. Literally in the last minute before leaving another beach to catch the return plane we found a stranded female with eggs still inside her eggcase shell. It was either destined for the hungry gulls or TMAG. TMAG won.

On returning to the Museum, I planned to mount a small display on the Paper Nautilus and its connection with Flinders Island. However, the material for the display just grew and grew. It now encompasses all of one wall of the corridor linking the main entrance and the Zoology Gallery.

The format has been designed by Jo Eberhard. A central panel of engaging computer graphics by Brent Davies revolves around some general information, the Greek myth of the argonauts and their warship Argo (of Jason and the Golden Fleece fame) and explanations of name confusions. Shells and preserved animals, graphics and even a calendar of historical drawings make up one section of the display. The colour photographs by Karen Gowlett-Holmes are outstanding.

An important section describes the connection with Flinders Island. Considerable help was given by several islanders on details of the island's trade in Paper Nautilus shells. Also included is a section on the Chambered or Pearly Nautilus shell, with many specimens and graphics. Although the two nautilus animals are not closely related, there is a similarity in shell size and shape. One of the main aims of the display is to to show that argonaut animals have a true molluscan 3-layered shell, and that it is the egg-case which is known as the Paper Nautilus. The display will be up throughout the summer of 1997-98.

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Back from the Dead...

The Southern hairy red snail *Austrochloritis victoriae* (Cox, 1868) (Camaenidae) has been rediscovered on King Island. It can now be removed from the 'presumed to be extinct' listing within the schedules of Tasmania's *Threatened Species Protection Act 1995*. Its new status is yet to be decided.

This snail was first collected by Cox in 1868 in southern Victoria where it still occurs. In 1887 it was found by R. M. Johnston at The Springs, Cape Wickham on King Island, Tasmania. It occurred through much of the northern end of King island in areas such as Pennys Lagoon and what is now the Lavinia Nature Reserve. Although records from those times are unclear, it is probable the snail was last recorded from King Island about 1920, despite extensive later searching.

On December 14th 1996 the snail was rediscovered at Lavinia Nature Reserve by Kevin Bonham, a keen naturalist and Tasmanian snail expert. Kevin has been researching Tasmanian snails in his spare time and has done snail surveys for various government departments. This was his first visit to King Island to search for *A. victoriae* and other snails. Kevin was with a party of field naturalists who were surveying potoroos and frogs. He found the snails in an area considered the most likely spot for the species.

A. victoriae is a land snail. It seems to occur in clusters amongst big piles of twigs or large logs. It lives in wet areas where there are tall tea-trees and *Banksia* scrub. The shells are reddish in colour, about 2cm wide and appear hairy under a microscope. The snail itself is a grey colour and has a fairly short neck. It feeds on detritus and the snails seem to congregate where large bodies of detritus are present. *A. victoriae* is an extremely slow-moving animal and has been clocked at 50cm per hour! It is hoped the snail still occurs elsewhere in the northeast of King island. Loss of suitable habitat has been responsible for the snail's decline.

[*Adapted from the Department of Environment and Land Management Web site,* http://www.delm.tas.gov.au/esl. – *Ed.*]

More information:

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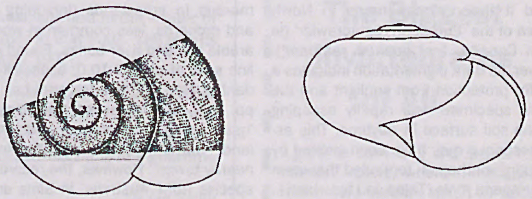


Illustration by Rhyllis Plant from Smith & Kershaw (1981), p. 110.)

Historical footnote

The Necessity for an Immediate and Co-ordinated Investigation into the Land and Fresh-water Fauna of Australia and Tasmania

by Sir Baldwin Spencer, K.C.M.G., F.R.S., D.Sc.

The matter of the investigation of the land and fresh-water fauna of Australia is one of pressing importance. From the purely taxonomic point of view the botanic record is probably more complete and satisfactory than the zoological. It is much more easy to collect and study plants than animals. The former cannot get out of your way, while it is a primary instinct of the latter to do so. It is very significant of what has taken place in regard to botanical collecting in Australia that there is a notable Banksian botanical collection, but no such Banksian zoological one. The time has come when it is imperative for us to make some organized attempt not only to take a census of our Australian fauna but to study it in its natural surroundings. Only those who have collected, more or less consistently, any special group of animals during the past twenty-five years realize to the full how rapidly our Australian fauna is being exterminated. Not many years ago it was possible to go just a few miles out of Melbourne to collect animals now unprocurable. The opening up of the country has had far-reaching effects upon the whole fauna. The introduction of dogs, cats, rabbits, and foxes, quite apart from the havoc caused by man in clearing the country, has meant the extermination of an appreciable part of the fauna. To take only one example: the destruction of the scrub and forest in the valley of the Bass River has resulted in the complete extermination of one of our most interesting marsupials, the little opossum-like *Gymnobelideus leadbeateri*. There are actually only four specimens of this extant, and it is extremely unlikely, owing to its very limited area of distribution, that any more will be found. To take another case in regard to lower but equally interesting forms: Some years ago a few of us interested in natural history spent a day or two turning over logs on the Dandenong hills. In one day we secured no less than thirteen species of land planarians, together with plentiful specimens of Peripatus and Geonemertes, the land nemertine. Searching the same spots recently, we found only a very few specimens of two species of planarians, no Peripatus, and no Geonemertes. Settlement and bush-fires are interfering disastrously with the land and fresh-water fauna, and yet it is perhaps the most interesting in any part of the world. Important as is the study of the marine fauna, we must. from a scientific point of view, realize very clearly the fact that this will ever be with us, and we can investigate it at our leisure; but the land and fresh-water fauna is disappearing rapidly, and unless we now make an organized effort it will be too late to study it effectually, and future generations will wonder what manner of people we were not to leave behind us some adequate record of the marvellously interesting forms of animal life which we had succeeded in exterminating...

– excerpt from
The Victorian Naturalist
37(10): 120-122 (1921)

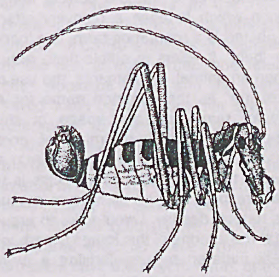
Back from the Missing...

The wingless scorpionfly *Apteropanorpa tasmanica* belongs in its own family, the Apteropanorpidae. *Apteropanorpa* is only known from Tasmanian alpine shrubland and has been collected on only a handful of occasions.

Apteropanorpa was first collected in 1939 on Mt Wellington (near Hobart) and Mt Mawson (Mount Field National Park). Other specimens were subsequently recorded from Mt Rufus (by Jean Jackson) and the Great Lake region of the Central Plateau (by Peter McQuillan). *Apteropanorpa* had not been collected on Mt Wellington since the devastating bushfire in February 1967.

Peter McQuillan (University of Tasmania) and I recently conducted a survey of *Apteropanorpa* with the intention of mapping its distribution and extracting its DNA to assess relationships with other scorpionflies. So far the survey has revealed healthy *Apteropanorpa* populations on Mt Mawson and Mt Wellington and at Lake Augusta on the Central Plateau. Bob Mesibov also collected a specimen this winter, near Cradle Mountain. This small, flightless insect, which spends its adult life on snow or on small alpine shrubs, has a wider distribution than we realised. It also appears to have survived the severe bushfires on Mt Wellington three decades ago.

Discovering and describing the immature stages and finding out more about the distribution and adult ecology and biology would make a great student project.



(Illustration by M. Quick from CSIRO's The Insects of Australia *(1991), volume 2, p. 703.)*

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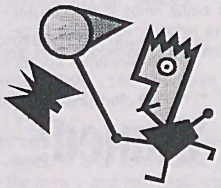

Coming to Tasmania for a quick sweep?

A notice of your planned collecting trip in *Invertebrata* could put you in touch with local experts, enthusiasts and volunteer helpers. Local zoologists would also be interested to hear where you went and what you found!

Rethinking the Common Name of *Astacopsis gouldi*

The Recovery Team for the threatened Tasmanian giant freshwater crayfish, *Astacopsis gouldi*, has in its Draft Recovery Plan followed a suggestion that the common name 'Lobster' be adopted during the recovery process. The argument, as I understand it, is that 'Lobster' has been a common name used for the species, particularly in northwest Tasmania, and that the term is appropriate because it generally refers to 'large crayfish with claws'. I would like to argue against the use of 'Lobster', and to offer an alternative name that I believe would more positively contribute to the recovery process.

First, perhaps, we should consider the appropriateness of 'Lobster', given the confusion surrounding a term used around the world for many exploited species. 'Lobster' translates from the Greek astacos, which provides the name for the Northern Hemisphere freshwater crayfish genus, *Astacus*. The infraorder Astacidea also derives its name from this source, and includes the true marine lobsters, Nephropidae (which occur in deep waters around Australia and are seldom seen). In Tasmania, our freshwater endemic genus, *Astacopsis*, also pays homage to the Greek, and so there might be a superficial logic to the common name 'Lobster' being applied to the largest member of this genus.

However, the perversity of common names being what it is, 'Lobster' has come to refer to numerous large, marine, stalk-eyed decapods that are exploited around the world for their flesh. Just to confuse the issue a little more, the Southern Rock Lobster, which is the basis of an important local fishery, is referred to as 'Crayfish' in Tasmania – a most confusing name for the rest of the world (and immigrants to Tasmania like myself) to cope with. The fact that 'Crayfish' are exported under the name Rock Lobster brings me to an important point: the world is a small place these days, and local names are often inappropriate for communicating to a global audience.

The point also needs to be made that Rock Lobsters do not have claws, nor do Shovel-nosed Lobsters (called Bugs!), so 'Lobster' obviously is not restricted to large crayfish with claws, marine or otherwise.

The confusion regarding 'Lobster' as a name, however, is not nearly as worrying as the mental picture that much of the world sees at the mention of the word. 'Lobster' on millions of restaurant menus around the world refers to a succulent food rather than an animal. I submit that this is not the correct image upon which to base a recovery effort. 'Lobster' is a marketing term, like 'pork' or 'beef'. It refers to edible flesh rather than an animal. In Tasmania, the use of 'Lobster' as the common name for *A. gouldi* reinforces the image of this species as a food in the minds of recreational fishermen. This is an image that needs to be altered if the species is to gain respect and be allowed to pursue its natural destiny. I would like to argue that the altering of this image is perhaps best initiated by popularising a more suitable common name.

When I was younger I completed a psychology thesis on psycholinguistics. Even though one result of this effort was to help convince me that I didn't want to be a psychologist, I gained an insight into the power of words and of the names we give things. Some of the concepts of psycholinguistics have since gained considerable prominence in our society, and I suggest that you only have to examine how words are used these days to realise that they are great manipulators of thought. Consider, for example, the greater acceptability of 'integrated logging' over its equivalent, 'clearfelling', or consider the title 'Forest Protection Society' for a forest exploiter's lobby group. Note, too, how words like 'chairman' and 'mankind' immediately bring forth the whole agenda of gender equality and fairness.

When the Deloraine Field Naturalists Group (DFNG) first started working on the conservation of *A. gouldi* in the late 1980s, the membership decided we should only refer to it as 'Tasmanian Giant Freshwater Crayfish'. Over most of the past decade, 'Crayfish' has been the usual term in most media reports, in bulletins and media releases from the Threatened Species Network, and in references such as *A Field Guide to Crustaceans of Australian Waters*. Freshwater crayfish sites on the Internet also avoid 'Lobster' as the common name for *A. gouldi*. The groundwork for moving away from the use of 'Lobster' has already been laid, and in Tasmania many people (in addition to DFNG members) who admire this creature object strongly to 'Lobster', and will continue to work against its usage. If 'Lobster' is to be the name used in the recovery process, then more compelling arguments will need to be put forward to convince people who currently view this name as highly inappropriate.

'To adopt a local name that is both inconsistent and suggestive of food does little justice to a species as spectacular as A. gouldi*'.*

It is perhaps important to reflect for a moment on the significance of the listing of a species as threatened. Once such a listing occurs, the eyes of the world are upon that species. It is thus important that a carefully chosen common name should have precedence over the various local names which might be confusing or send the wrong message. Unfortunately, common names have no scientific standing, and the notion of having official English common names has not gained wide acceptance, except recently in the case of birds. But there is no escaping the fact that common names are important for communicating with the vast majority of people, who do not use scientific names. A recovery team for a species needs to consider that they will be communicating with the wide range of people around the world who are concerned with the conservation and survival of species on this planet. To adopt a local name that is both inconsistent and suggestive of *food* does little justice to a species as spectacular as *A. gouldi*.

The use over the past decade of 'Tasmanian Giant Freshwater Crayfish'

(Continued on page 9)

Wanted!

Regular reports of people news and invertebrate goings-on from the University of Tasmania (all campuses and relevant departments and centres), Parks and Wildlife Service, Inland Fisheries Commission, CSIRO Marine Labs and any other agencies or institutions studying invertebrates in Tasmania. News for the March *Invertebrata* can be e-mailed to the editor before the end of February:

mesibov@southcom.com.au

(Continued from page 8)

has been effective in drawing attention to the species, but it has also been a mouthful, and it is more a description than a name. The Tasmanian Aboriginal name for the animal, 'Tayatea', was probably in use for thousands of years, and has much to recommend it as a suitable replacement. First, it acknowledges the original inhabitants of this island, whose culture has never been adequately recognised in European Tasmania. Second, 'Tayatea' has a simple elegance as well as a romantic link to a past when the species was the dominant predator in our freshwater systems. This link reminds us what has been done to those habitats in a little over 100 years: stream pollution, clearing of native streamside vegetation, introduction of trout and overfishing of giant crayfish. Third, 'Tayatea' is conformable with well-known mainland names for Australian freshwater crayfish, such as Koonac, Marron, Yabby and Gilgy. Fourth, it signals a change in local atitude which will draw attention to the species, and attention is exactly what is needed for gaining media coverage during the recovery period. By challenging people to call this special creature something new (actually, something very old), we bring to the forefront the need to change our attitude towards native fauna.

In recent years, we have tried to come to terms with words that reflect exploitation within our own species. Critics of this process of recognising and changing our discriminatory terms have labelled it 'political correctness'. For some, especially those who have reason to resist change, 'political correctness' suggests sinister intentions and a political agenda. Nevertheless, the striving towards non-discriminatory usage reflects a need in our society to change attitudes and to institute more equitable practices. It is only logical that we should extend the concept of using names or terms as subtle levers for attitudinal change to include fellow species that we have shamefully exploited to the edge of existence. The answer to 'What's in a name?' may well be 'Dignity'! Let's view the recovery process for *A. gouldi* as a an opportunity to recover dignity for this species as well. By adopting the common name 'Tayatea', used by the original Tasmanians, we could do much to promote the plight of *A. gouldi*, as well as contribute to the reconciliation process.

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Notices & reviews

A Field Guide to Insects in Australia
by Paul Zborowski and Ross Storey.
Reed Books Australia, 1995, reprinted 1996, ISBN 0 7301 0414 1, 207 pp., $29.95.

Backyard Insects
by Paul Horne and Denis Crawford.
Miegunyah Press at Melbourne University Press, 1996, ISBN 0 522 84737 4, 232 pp., $24.95.

The *Field Guide* is a fluent, concise manual packed with information and illustrations. The layout is clear and space is not wasted. It is indeed a field handbook. It contains 103 colour photographs, 47 drawings and 182 pages of text. It is a useful reference for identifying insects. It gives a systematic overview of the larger or more commonly encountered insect groups. It does not cover collecting or preserving in detail and does not claim to do so.

One annoying feature in the *Field Guide* is the reference to a different chapter of CSIRO's *Insects of Australia* at the end of each order. One reference would be better and the space saved could be used for other leading references to particular orders. The *Guide* defines an instar and then uses the term 'stage' in a caption. It may be in error in saying that geometrid moths have ears at the back of the thorax. I think noctuid moths have their ears (tympanal organs) here while geometrids have them on the front of the abdomen.

In the section on hand collecting the *Field Guide* forgot to mention the handy and variable forceps. It also did not mention the hazards of ultraviolet light. I think Geoff Montieth's elegantly simply pooter design using a bendy straw, a film container and a piece of gauze should be included in every collecting manual.

I recommend the *Field Guide* as a general identification reference. What we really need is more guides devoted to individual orders or families because it is impossible to do justice to 86 000 species with 103 photographs.

Backyard Insects presents 128 photographs to cover a smaller subset of insects. Each photograph faces a companion text (less than half a page for 18 photographs). The information presented varies greatly from species to species. Often much of the entertaining information is not strictly relevant to backyard situations.

I guess it is the title that annoyed me most about this book. The book is fine but is was given the wrong name (do publishers have rules of nomenclature?). It is a potpourri of excellent photographs and diverse information about common insects. General ecological niches are mentioned and in a few cases several photographs illustrate stages of one species but *Backyard Insects* is not a handy reference to the various life stage transformations, diets and comings and goings of backyard insects.

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Alpine Tasmania: An Illustrated Guide to the Flora and Vegetation
by Jamie Kirkpatrick, with photographs by Peter Dombrovskis and illustrations by Georgina Davis and Jo Eberhard. Oxford University Press, 1997, ISBN 0 19 553753 X, 196 pp., $24.95.

A Guide to Flowers & Plants of Tasmania, Revised Edition
by Launceston Field Naturalists Club, ed. Mary Cameron. Reed Books, 1996, ISBN 0 7301 0502 4, 120 pp., $19.95.

The Ferns of Tasmania: Their Ecology and Distribution
by Michael Garrett. Tasmanian Forest Research Council, Inc., 1996, ISBN 0 7246 3519 X, 217 pp., $49.95.

Tasforests vol. 8 (special issue on Tasmanian eucalypts).
December 1996, 165 pp., free at Forestry Tasmania offices.

Invertebrate zoologists need to know their plants, if only to describe correctly the macro- and microhabitats in which they find their specimens. These four recent publications are superb guides for us non-botanists. The *Tasforests* volume is a textbook on our eucalypts, with chapters on field identification, evolution, botanical history and distribution (including ecological notes). *Alpine Tasmania* and Michael Garrett's fern guide are specialist 'must-haves', and the LFNC book, with colour photographs of 300 species, is probably the most thumbed-through plant book in this reviewer's household.

Bob Mesibov

Around the traps

Queen Victoria Museum and Art Gallery

Tim Kingston and Rob Blakemore both made the very worthwhile trip to Adelaide to attend the inaugural conference of the Society of Australian Systematic Biologists and the associated 'Software in Systematics' Workshop. Rob presented a paper on the earthworms of Lake Pedder, including an endorsement of the 'probably extinct' status of the Lake Pedder earthworm. While in Adelaide Tim also attended the annual meetings of the Council of Heads of Australian Fauna Collections and the Council of Heads of Australian Entomological Collections. Feelings of professional isolation are thus suppressed for the time being. Talking of isolation, Rob will board the *Aurora Australis* on 6 November for his expedition to Macquarie Island to investigate its distinctive earthworm fauna. In case this should give the impression that studies of the earthworms of the north island of Tasmania are complete, I hasten to point out that there are still many new species from here yet to be described. However, after nearly two years spent in his Rocherlea 'laboratory' who would begrudge him a change of scenery? On second thought Macquarie Island will probably not seem so remote after all! Following conversion of the aquarium display from marine to freshwater it has now been stocked with a couple of crayfish and a few fish, native of course, to northeast Tasmania. The crayfish belong to the world's largest non-marine invertebrate species, *Astacopsis gouldi*. The larger of the two individuals weighed in at 2.1kg which is an impressive lump of crustacean.

Tim Kingston

Tasmanian Museum and Art Gallery

The Invertebrate Section of the Tasmanian Museum and Art Gallery is stepping up its campaign to have complete collection databases by the end of next year. In some cases the collections will be imaged as well. An extensive display has been set up in the Zoology Gallery depicting the scientific and social aspects of the Paper Nautilus (*Argonauta*) and the Pearly Nautilus molluscs. An explanation of the display has been included in this edition of *Invertebrata* (see p. 6). Invertebrate Curator Roger Buttermore is a 1998 Churchill Fellow and will do further research on the bumblebee *Bombus terrestris*. Bumblebees have spread throughout southern Tasmania since their illegal introduction in 1992 and expansion into mainland Australia is likely. Bumblebees have advantages over honeybees for crop pollination, especially in greenhouses. Several overseas companies rear bumblebees for horticultural use, with total sales of about AUD$50 million per year. Study of their commercial potential in Tasmania (and possible negative effects) is urgently needed. Since 1993 Roger has surveyed 18 feral Tasmanian colonies (results in press) and submitted a second paper, besides attending an international pollination symposium in Canada in 1996. The Churchill Fellowship will allow him to visit European, Canadian and New Zealand laboratories from May to July 1998. He will be studying bumblebee rearing techniques, bumblebee genetics, methods of mapping their spread and their potential pest status. Liz Turner is planning to go to 'The Other 99%' invertebrate conference in Sydney in December. She has recently returned from a month in the UK and USA. While in the UK she stayed with David Brown of The Natural History Museum in London. David is revising the Tasmanian freshwater *Gyraulus* snails, with at least one new species. Mike Tobias has completed his six months of work as an invertebrate scientific illustrator at the Tasmanian Museum, and is now working part-time in a voluntary capacity. His illustrations of 'blood-suckers' are outstanding and it is hoped that they will be published as a Tasmanian Museum publication in the near future.

Liz Turner

Department of Primary Industry & Fisheries – New Town Laboratories

I have submitted the following for adding to the Web site for the Council of Heads of Australian Entomological Collections (CHAEC) as no one else was interested in publishing it and I thought it important to be in the public domain: *Further Type Specimens of Terrestrial Arthropods in the Principal Collections in Tasmania*, at www.mov.vic.gov.au/chaec/index.html.This document adds to the listings previously published by Alison Green in 1974 and Peter McQuillan in 1984.

Trevor Semmens

Forestry Tasmania

We have moved! You can find our laboratories under the largest-span wood-frame dome in the Southern Hemisphere at 79 Melville Street in Hobart. Unfortunately the insect collection is housed in the attic, which is dark and gloomy. However the lab facilities are great and we are pleased to have visitors to the building. The 'forest' in the dome is open to the public to stroll around in so pay us a visit. Around the State you may see red triangular insect traps stapled to trees in parks and reserves.These are to detect the incursion of Asian Gypsy Moth (AGM) which is a voracious feeder on over 600 species of trees and shrubs. The joint AQIS/Forestry Tasmania project will monitor the presence of adult moths to determine if the moth is already established. The trial run last year failed to detect AGM which is good news.I have some handouts on the perils of AGM if anyone is interested.

Dick Bashford

Zoology Department, University of Tasmania

Several invertebrate Honours projects are just winding up and producing interesting results. Patricia Coleman has been studying the interaction between an isopod parasitic castrator (*Portunion* sp?) and the crab *Helograpsus haswellianus*. Surprisingly the parasitised crabs do better at almost everything than their unaffected compatriots – everything except breeding, that is. Patricia calls them 'Supercrabs', but her supervisor prefers 'the Living Dead'. Sam Lewis has been looking at the effect of juvenile Green crabs on native intertidal communities, and the bad news is that they are just as nasty as their mothers and fathers. Sam Hannon has surveyed the helminth fauna of galaxiids and some trout in Lakes Sorell and Crescent. There are several species of helminths and the differences between the two lakes that have been known for a long time in the free-living biota are matched by the parasites, at least to some extent. Chris Cleary has been looking at the distributional ecology of two *Austropyrgus* morphs/species, also in Lake Sorell. One has a keel around its whorls and seems to prefer life on sand, while the other prefers rocks. The Department received a visit from Dr. Rudolf Diesel, of Bielefeld University in Germany. Rudi is interested in social behaviour in crustaceans, amongst other things, and is well-known for his work on maternal care by bromeliad crabs (*Metapaulius* spp.) in Jamaica. He was here to visit Alastair Richardson and see some of Tasmania's burrowing crayfish, with a view to developing work on their social behaviour, particularly in those species in which several generations of offspring must cohabit with their mother until they have an opportunity to disperse from the natal burrow. Dreadful weather inhibited (but did not entirely foil) the field demonstration of the species in the Northeast and the Southwest, and we hope that Rudi will be back to start a program before too long.

Alastair Richardson

Department of Geography & Environmental Studies, University of Tasmania

Peter McQuillan is currently supervising the following invertebrate-related projects:

Andrew, Jane (M.Env.St –Research), Biogeography of the endemic freshwater crustacean *Anaspides tasmaniae*.

Berry, Katrina (M.Env.St.–Minor Thesis), Variation in wing phenotype of the butterfly, *Oreixenica lathoniella*, over environmental gradients in Tasmania.

Bonham, Kevin (Grad.Dip.Env.Stud.–Hons.), Biogeography of the snail genus *Pernagera*.

Dunn, Helen (PhD Env.St.), Conservation of the invertebrate fauna of the streams of the west coast of Tasmania.

Gee, Jane (Grad.Dip.Env.Stud.–Hons.), Conservation ecology of rare moths in the Tasmanian Midlands.

Hingston, Andrew (BSc–Hons.), The impact of the Large Earth Bumblebee (*Bombus terrestris* L.) on Tasmanian ecosystems.

Mallick, Stephen (PhD Env.St.), The ecological effects of Honey bees in the Tasmanian World Heritage Area.

Michaels, Karyl (PhD Env.St.), The conservation ecology of carabid beetles in Tasmania.